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(54) Abstract Title
Washing composition capsules

(57) A washing capsule comprises a self-supporting receptacle part 2 charged with a washing composition and a closure part, typically a thin film. Both parts are made of water-soluble polymer but the closure part dissolves more quickly. The capsules are manufactured as an array, which can then be split into individual washing capsules. A washing capsule is entirely consumed in a washing process, for example a clothes washing or dishwashing process. The invention offers advantages of convenience and safety.

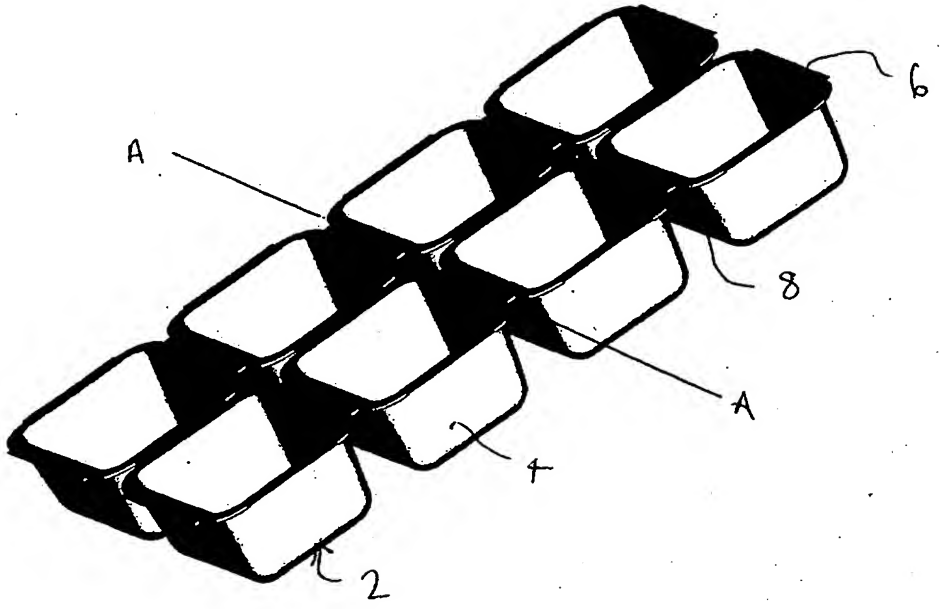

Fig 1

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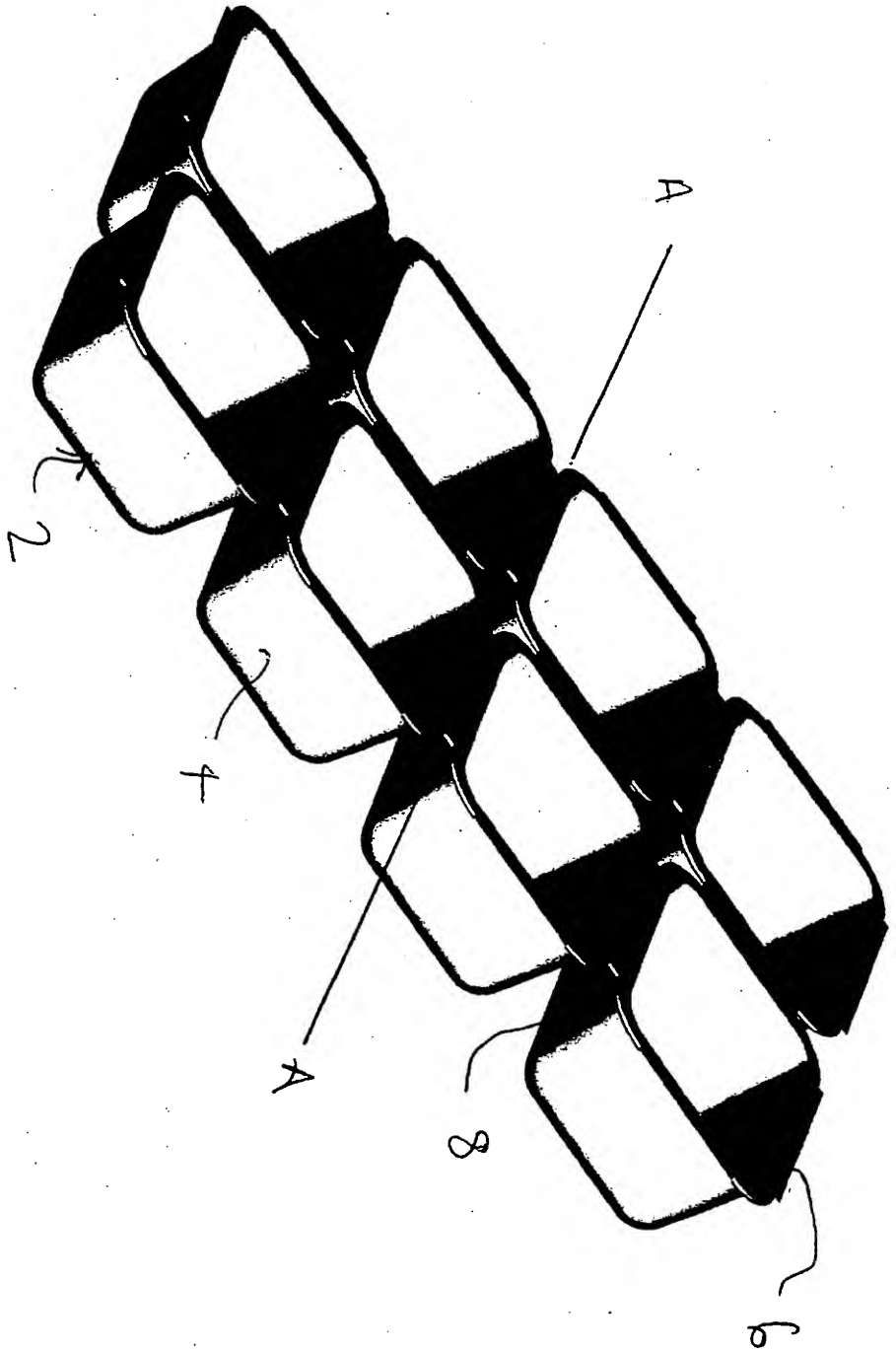


Fig 1

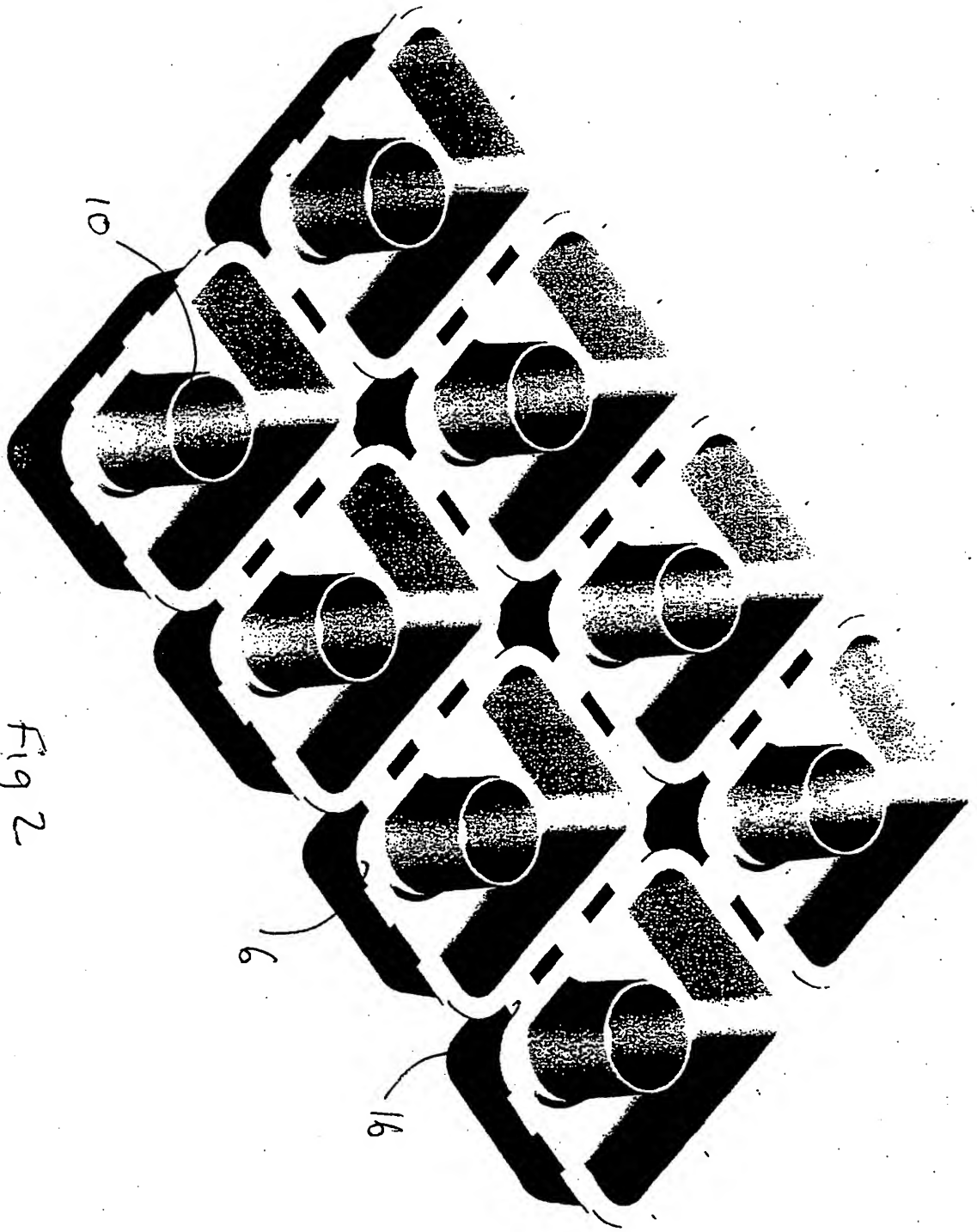


Fig 2

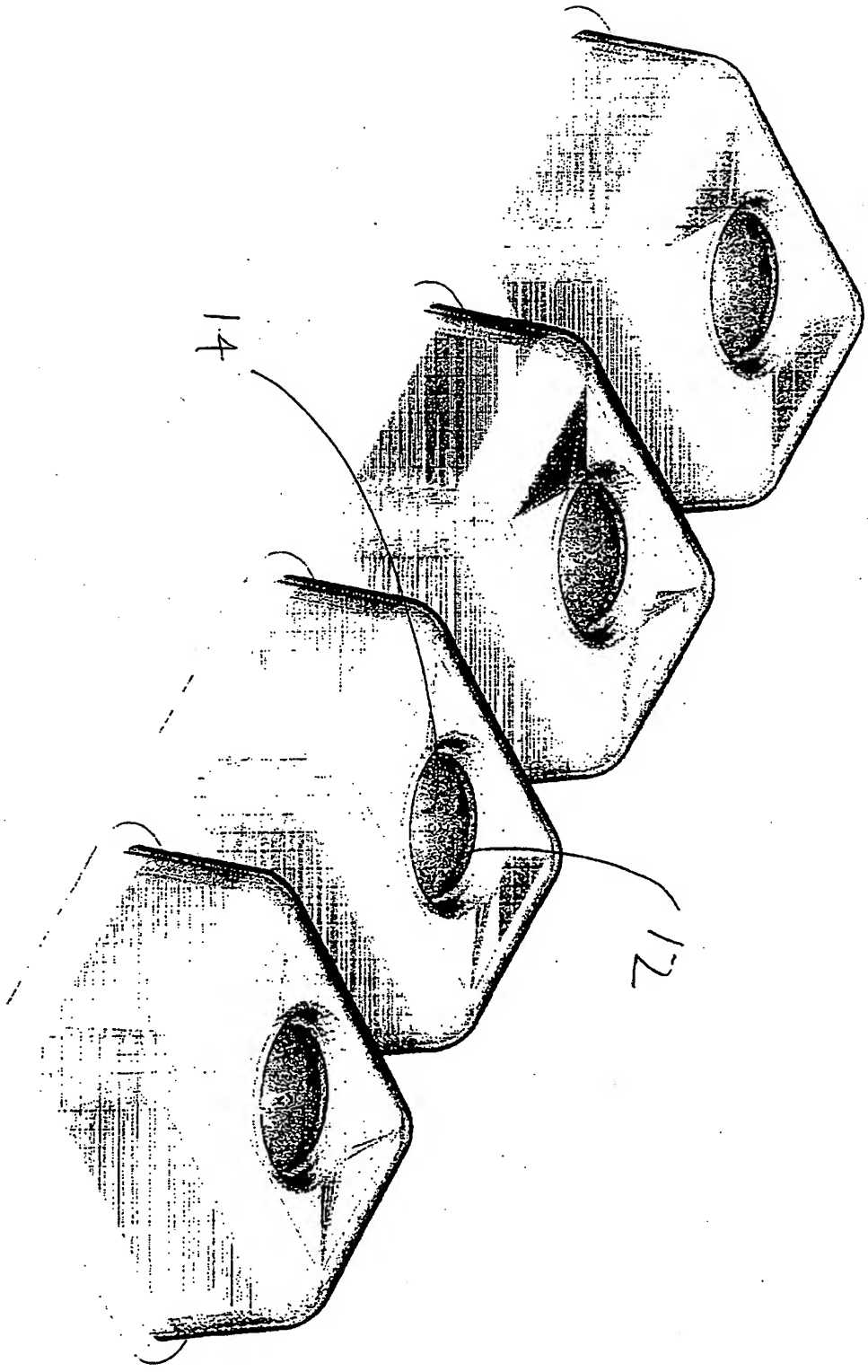


Fig 3

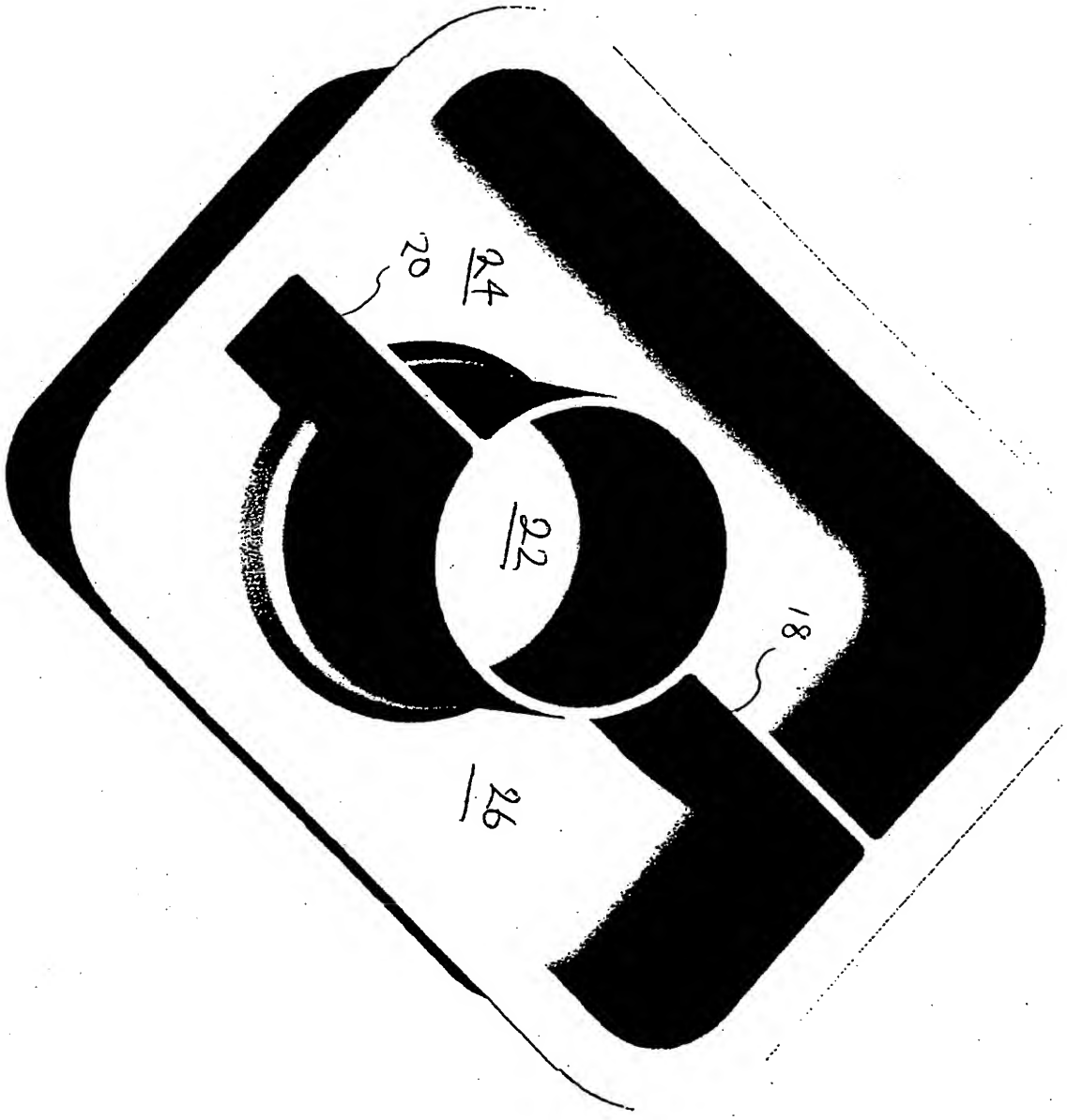


fig 4

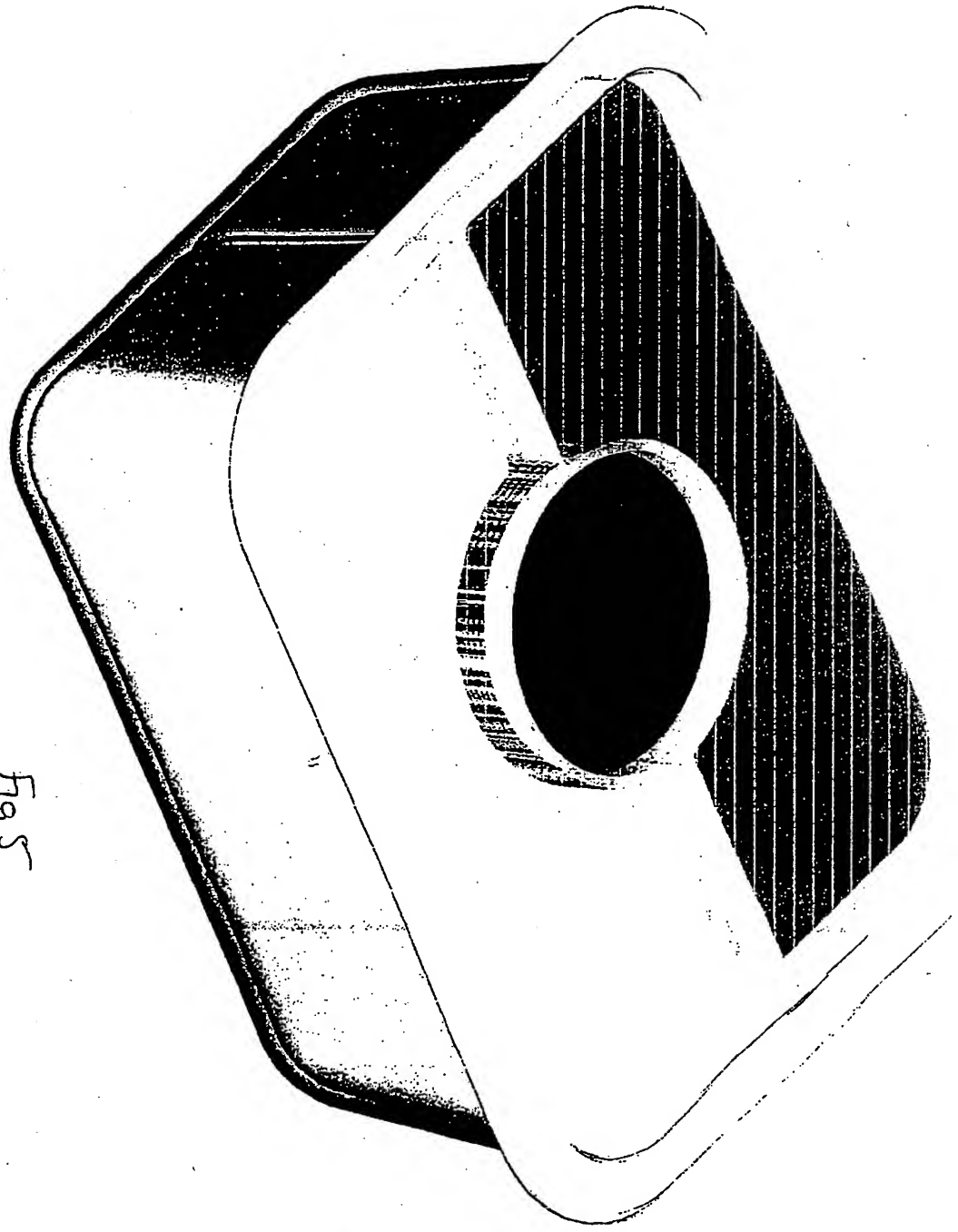
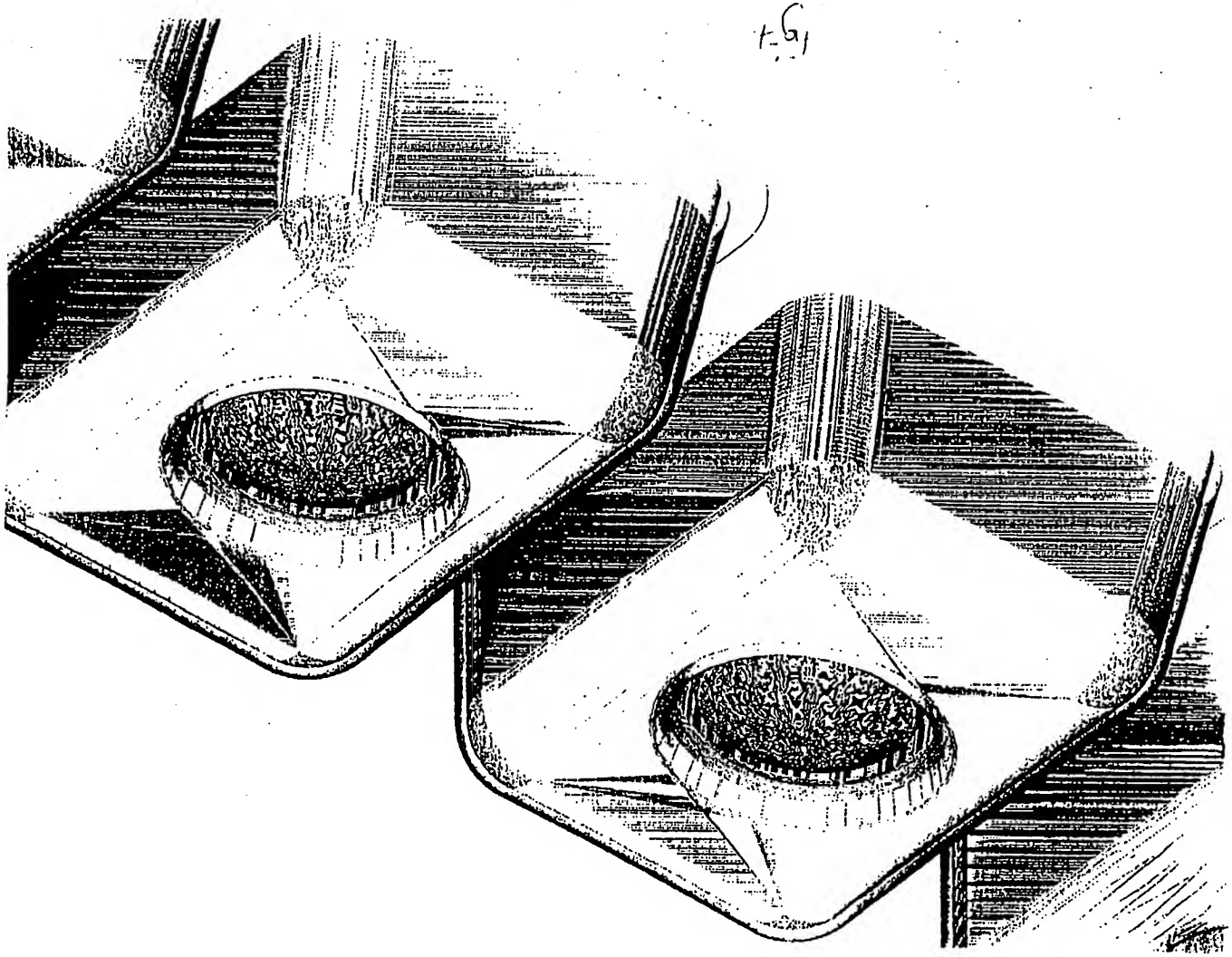


Fig 5

Fig 6



Improvements in or relating to Compositions

This invention relates to improvements in the delivery of washing compositions to ware washing machines (including clothes washing machines and dishwashing machines).

Clothes washing compositions may be delivered to a clothes washing machine by a delivery tray from which the composition is fed into the washing drum, or they may be placed directly into the washing drum. The washing compositions may be in powder, liquid or block form. Liquid compositions have the disadvantage that they may be spilt. The same applies to powder compositions. Powder compositions have the additional disadvantage that they may produce dust which can be inhaled. These problems are overcome or lessened when blocks of washing composition are used. These are normally individually wrapped. On unwrapping a block, for use, it is still possible that some dust may be produced. Additionally it is an inconvenience for the consumer to have to unwrap the block. Furthermore it is almost impossible for the user to avoid some contact between the block and his or her skin, so leading to a requirement for the user to wash their hands after starting the washing machine. In fact, all of the methods described involve a risk of contact between the composition and the skin, and it is desirable in all cases for the user to wash their hands after starting the washing machine. In this context it should be borne in mind that many composition contain enzymes to assist the cleaning action. Even though the user may tolerate enzyme residues which may be left in clothes after washing, they may still not tolerate contact between the concentrated washing composition containing the enzymes, and the skin.

Similar considerations apply in relation to dishwashing machines. Thus, in relation to dishwashing compositions there are also problems of spillage, dust generation, skin contact and inconvenience.

There is a need for a means of delivering a washing composition to a ware washing machine in a manner which is safe and highly convenient.

In accordance with a first aspect of the present invention there is provided a washing capsule comprising a self-supporting receptacle part and a closure part, the receptacle

part and the closure part together enclosing a washing composition, the receptacle part being formed of a water-soluble polymer, and the closure part being formed of a water-soluble polymer, wherein, in use, the closure part dissolves before the receptacle part.

Because the receptacle part is self-supporting the washing composition may readily be fed into it in manufacture, prior to location of the closure part.

Preferably, the receptacle part has side walls which terminate at their upper end in an outward flange, to which the closure part is sealingly secured. The securement may be by means of an adhesive but is preferably achieved by means of a heat seal, between the flange and the closure part.

Preferably, the closure part is a plastics film secured over the receptacle part.

Preferably, the closure part is of thinner material than the receptacle part. Thus, typically, the closure part is of thickness in the range 10-200 microns, preferably 50-100 microns, and the wall thickness of the receptacle part is in the range 300-1500 microns, preferably 500-1000 microns.

Preferably, the closure part dissolves in water (at least to the extent of allowing the washing composition in the receptacle part to be dissolved by the water; and preferably completely) at 40°C in less than 5 minutes, preferably in less than 2 minutes.

The receptacle part and the closure part could be of the same thickness but in this event the closure part should be of higher solubility than the receptacle part, in order to dissolve more quickly.

Preferably, the washing capsule is generally cuboid in its external shape, with the top wall being formed by the closure part, and with the side walls and base wall being formed by the receptacle part.

Preferably, a washing capsule of the invention is manufactured by forming an array of receptacle parts, each receptacle part being joined to adjacent receptacle parts, and being separable from them by a snap or tear action. The array is preferably one

which has columns and rows of the receptacle parts. The receptacle parts may be separated by frangible webs of the water-soluble polymer. Alternatively, the receptacle parts may be manufactured with the aforementioned flanges, such that they are separated from each other by a line of weakness. For example the material may be thinner, and so able to be broken or torn readily. The thinness may be a result of the moulding process or, preferably, of a later scoring step.

In the manufacturing method, the array, formed by thermoforming or, preferably, by injection moulding, is fed to a filling zone, and all the receptacle parts are charged with the washing composition. A sheet of a water-soluble polymer may then be secured over the top of the array, to form the closure parts for all the receptacle parts of the array. The array may then be split up into the individual washing capsules, prior to packaging, or it may be left as an array, for packaging, to be split by the user. Preferably, it is left as an array, for the user to break or tear off the individual washing capsules. Preferably, the array has a line of symmetry extending between capsules, and the two halves of the array are folded together, about that line of symmetry, so that closure parts are in face-to-face contact. This helps to protect the closure parts from any damage, between factory and user. It will be appreciated that the closure parts are more prone to damage than the receptacle parts. Alternatively two identical arrays of washing capsules may be placed together with their closure parts in face-to-face contact, for packaging.

Suitable as water-soluble polymers are polyvinyl alcohol, polyglycolides, gelatin, polylactides, polylactide-polyglycolide copolymers and cellulose ethers, for example hydroxypropylmethylcellulose (HPMC).

The washing composition contained by the washing capsule may be any which is suitable for the designated clothes washing or dishwashing application, and need not be described here. It may be a powder or a liquid but if a liquid, should be a low water formulation, preferably having a maximum water content of 5 wt%, in order to maintain the integrity of the walls of the capsule. The composition may be formulated having regard to the fact that the user will not come into contact with the composition, whether by inhalation or by skin contact. For example, the composition may include an enzyme, without concern about physical contact between the composition containing the enzyme, and the user.

In some embodiments of the invention the receptacle part may define a single compartment. In other embodiments of the invention the receptacle part may define two or more compartments, which contain different products useful in a washing process. In such a situation a dividing wall or walls of the compartments preferably terminate at the top of the receptacle part ie in the same plane as the top edges of side walls, so that when the receptacle part is closed by the closure part the contents of the compartments cannot mix. The receptacle part may be provided with an upstand, preferably spaced from the side walls of the receptacle part, and preferably of generally cylindrical shape. If wished, the remaining volume of the receptacle part can be divided into two or more parts by means of walls extending between the upstand and the side walls.

The receptacle part may be formed with an opening, for example a depression, formed in the side wall or the base wall, and preferably being open in the outward direction. That is to say, it preferably does not form part of the main volume defined by the receptacle part. Preferably the opening is adapted to receive, in a press-fit manner, a solid block (for example a tablet) of a material useful in a washing process.

Preferably, the closure part is of a transparent or translucent material, so that the contents of the washing capsule can be seen.

Preferably, the receptacle part is of a transparent or translucent material, so that the contents of the washing capsule can be seen.

The washing composition within the receptacle part, or within a compartment of a receptacle part having more than one compartment, need not be uniform. For example during manufacture it could be fed first with a settable agent, for example a gel, useful in a washing process, and then with a different material. The first material could dissolve slowly in the washing process so as to deliver its charge over a long period within the washing process. This might be useful, for example, to provide delayed or sustained delivery of a softening agent in a clothes washing capsule.

The washing composition may include a tablet. Preferably a tablet contains a material useful in a washing process and is formulated to provide slow release of that

material during a washing process; and/or delayed release thereof. Delayed release may be achieved by providing the tablet with a coating which is slow to dissolve during the washing process.

A tablet may be provided in the main volume of the receptacle part or may be provided in an outwardly facing opening or depression, as previously described.

When a washing capsule of the invention has a tablet retained in an outwardly facing opening or depression the tablet is preferably one which will not transfer any washing composition to the hands of a user. For example, it may be coated with a soluble polymeric material. As mentioned above, this may also be desirable for delayed release of its charge.

In accordance with a further aspect of the invention there is provided a method of ware washing, comprising use of a washing capsule as described and defined above, the method entailing introducing the washing capsule into a ware washing machine prior to commencement of the washing process, the washing capsule being entirely consumed during the washing process.

The invention will now be further described, by way of example, with reference to the accompanying drawings in which.

Fig. 1 is a perspective view, generally from above, of an array of receptacle parts;

Fig. 2 is a perspective view, generally from above, of an alternative array of receptacle parts;

Fig. 3 is a perspective view of some of the parts shown in Fig. 2, but looking generally from underneath;

Fig. 4 is a perspective view, generally from above, of a third embodiment of receptacle part;

Fig. 5 is a perspective view, generally from above, of the Fig. 4 embodiment, but filled with washing composition and closed over by a closure part, to form a washing capsule of the invention;

Fig. 6 is a perspective view from above of a fourth embodiment of receptacle part; and

Fig. 7 is a perspective view from below of receptacle parts of the type shown in Fig. 6.

Fig. 1 shows an array of eight receptacle parts 2, arranged as two columns and four rows. Each receptacle part has a flat base wall without indentations or recesses and four uprights side walls 4, and has no top wall. Thus, each receptacle part is upwardly open. Around its opening, at the top of the side walls 4, is an outwardly-directed flange 6, which extends around the entire opening. The receptacle parts are joined to adjacent receptacle parts by webs 8 between the flanges 6. The flanges 6 of all of the receptacle parts lie in one plane. The base walls of all of the receptacle parts also lie in one place, parallel to the plane in which the flanges lie.

The array shown in the drawing is made by injection moulding. The thermoplastic polymer employed in this embodiment is polyvinyl alcohol, and is translucent. The wall thickness is about 0.7 mm. The resulting moulded array is self-supporting.

After injection moulding score lines may be cut into the webs 8 between the flanges, to aid the breaking apart of the washing capsules, for use.

The moulded array is fed to a filling zone where the receptacle parts are simultaneously filled via eight nozzles, with a dishwashing composition. The dishwashing composition could be a powder, gel or paste or could be a liquid formulation (but if so should be a liquid formulation of relatively low water content, given the properties of the polymer). A translucent cover film is then laid over the array and heat sealed against the flanges 6, so that each receptacle part has, over it, a closure part. The closure part is also of polyvinyl alcohol, but is much thinner, about 80 microns in this embodiment.

Although the film which constitutes the closure parts is tough it will be appreciated that it is inevitably less robust than the receptacle parts. Therefore before packaging the product, capsules are put into face-to-face contact. An array of washing capsules identical to that of the drawing may be placed in face-to-face contact with it.

Alternatively, and conveniently, the array shown in the drawing may be folded about line A-A shown in Fig. 1.

The drawing illustrates the invention but in practice an array of receptacle parts is likely to be considerably larger. Nevertheless, the manufacturing method would be as described.

In use, a user will simply break off a washing capsule from the array, and put it in the dishwashing machine. During the washing process the entire washing capsule will dissolve. The first part to dissolve will be the closure part. This will happen very quickly once the washing process starts and the washing composition will immediately be delivered. The receptacle part will dissolve more slowly but it will have dissolved entirely by the end of the washing process.

Figs. 2 and 3 show an alternative embodiment of the receptacle parts. The receptacle parts shown in Figs. 2 and 3 are of similar shape and size to those shown in Fig. 1, but have, within the main chamber defined by the base wall and side walls of each receptacle part, a generally cylindrical upstand 10, in a central position. Each upstand is open at its upper end, and its upper end is in the same plane as the flange 6.

As shown in Fig. 3, each receptacle part also has a depression 12 at a central position in its base wall. The depression is relatively shallow, and it is aligned with the upstand 10 carried by the base wall on its other side. Each depression contains within it a tablet 14. Each tablet contains a washing composition or a material which forms part of a washing composition, but is formulated for slow release and/or delayed release. For slow release it may be a tablet which dissolves over an extended period. For delayed release it may be a table coated with a polymeric coating which is slow to dissolve, so that it releases its charge in the middle or towards the end of a washing cycle.

Another difference between the embodiment of Fig. 2 and that of Fig. 1 is that in the Fig. 2 embodiment there is a plurality of breakable webs 16 of polymeric material extending between the flanges of adjacent receptacle parts.

The array shown in Figs. 2 and 3 is again made by injection moulding, using HPMC

polymer having a wall thickness of about 0.8 mm. Tablets 14 are press-fitted into the depressions 12 in the undersides of the base walls. The array is then inverted for filling. The upstands 10 are filled with one material, and the remaining volumes, between the upstands and the side walls of the respective receptacle parts, are filled with another material. A cover film is then laid over the array and heat sealed against the flanges 6 and against the ends of the upstands 10, so that each receptacle part has, over it, a closure part. The closure part is of HPMC, about 70 microns thick.

The embodiment shown in Figs. 4 and 5 is similar to that of Figs. 2 and 3 in having an upstand. However the remaining volume of the receptacle part is divided into two by means of walls 18, 20, extending from the upstand in opposed directions, and with each connecting with a respective side wall of the receptacle part. It will be apparent that the receptacle part comprises three main chambers whose contents are released into the washing water once the closure part dissolves. One chamber 22 is defined within the upstand and the other chambers 24, 26 are of identical size to each other and are defined between the upstand and the side walls. The underside of the receptacle part may, like the embodiment of Figs. 2 and 3, comprise a central depression into which is pressed a tablet. The receptacle parts are formed, in an array, by injection moulding.

Fig. 5 shows a washing capsule which uses the receptacle part shown in Fig. 4. The receptacle part has been filled with three different materials useful in a dishwashing cycle and a cover film is shown in place.

The embodiment of Figs. 6 and 7 is simpler than those of Figs. 2-5. The receptacle part shown does not have a central upstand. There is one main volume. However the underside of the base wall is moulded with a depression and into this depression is press-fitted a tablet. In the embodiment of Figs. 6 and 7 the main chamber of the receptacle part can be filled with two or more gels which stay separate, for example, side by side, or one within the other, or in the form of separate stripes. The receptacle parts of Figs. 6 and 7 may be formed, in an array, by vacuum forming.

In the embodiments of Figs. 4-7 the materials selected for the receptacle parts and closure parts, and their thicknesses, are as described for the Fig. 1 embodiment.

CLAIMS

1. A washing capsule comprising a self-supporting receptacle part and a closure part, the receptacle part and the closure part together enclosing a washing composition, the receptacle part being formed of a water-soluble polymer, and the closure part being formed of a water-soluble polymer, wherein, in use, the closure part dissolves before the receptacle part.

2. A washing capsule as claimed in claim 1, wherein the receptacle part has side walls which terminate at their upper end in an outward flange, to which the closure part is sealingly secured.

3. A washing capsule as claimed in claim 1 or 2, wherein the closure part is a plastics film.

4. A washing capsule as claimed in any preceding claim, wherein the washing composition comprises a powder, gel, paste or low water liquid formulation.

5. A washing capsule as claimed in any preceding claim, wherein the washing capsule comprises a tablet formulated for delayed and/or sustained release of a material useful in a washing process.

6. A washing capsule as claimed in any preceding claim, wherein the receptacle part defines two or more compartments which contain different products useful in a washing process.

7. A washing capsule as claimed in claim 6, wherein the receptacle part comprises an upstanding wall which separates compartments thereof.

8. A washing capsule as claimed in claim 6 or 7, wherein the receptacle part comprises an outwardly facing opening into which a tablet comprising a material useful in a washing process is press-fitted.

9. A washing capsule as claimed in any preceding claim, where the washing composition contains an enzyme.

10. A washing capsule as claimed in any preceding claim wherein the closure part is of a transparent or translucent material.

11. An array of washing capsules as claimed in any preceding claim, wherein the washing capsules are joined together but are readily separable from each other for use.

12. An array as claimed in claim 11, wherein the array has a line of symmetry extending between capsules, and the two halves of the array are folded together about the line of symmetry, with the closure parts in face-to-face contact.

13. A method of manufacturing an array of washing capsules as claimed in claim 11 or 12, which method comprises: forming an array of receptacle parts, each receptacle part being connected to adjacent receptacle parts but being separable from them by a snap or tear action; charging the receptacle parts with washing composition; and sealingly securing a sheet of a water-soluble polymer over the top of the array, to form the closure parts for all the receptacle parts of the array.

14. A method of ware washing, comprising use of a washing capsule as claimed in any of claims 1 to 10, the method entailing introducing the washing capsule into a ware washing machine prior to commencement of the washing process, the washing capsule being entirely consumed during the washing process.

15. A washing capsule or array thereof substantially as hereinbefore described with particular reference to the accompanying drawings.

16. A method of ware washing substantially as hereinbefore described with particular reference to the examples.

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Application No: GB 0008174.5
Claims searched: 1-16

Examiner: Michael Conlon
Date of search: 6 September 2000

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.R): C5D D181 B8C CPA CWA2 CWX

Int Cl (Ed.7): A47L15/44 C11D17/04

Other: Online: WPI EPODOC PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB2305931 A (Burman-Muller)	1
A	EP0284334 A2 (Clorox) page 4 lines 48-49	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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